ROCKY FLATS PLANT
GOLDEN, COLORADO
TECHNICAL REVIEW COMMENTS
DRAFT RFI/RI WORK PLAN
OPERABLE UNIT 12

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 8, Federal Facilities Branch
Denver, Colorado

1.0 INTRODUCTION

General comments refer to the overall organization and quality of the entire work plan or sections of the plan. Specific comments are referenced to a particular paragraph in the text.

2.0 GENERAL COMMENTS

1. Section 1.0 describes the OU12 background and physical setting. The text is similar to other work plans and provides an adequate description of the site. Several of the figures used in Section 1.0 have come from work plans for other OUs with little or no modification. Therefore, several minor improvements in the figures would make them appropriate for this work plan. The specific comments section discusses these improvements.

2. Section 2.0 (site characterization, previous investigations, geology and hydrology, nature of contamination, and site conceptual model) is largely drawn from existing documents. The site characterization section is based on the historic release report (HRR) and summarizes the history of each individual hazardous substance site (IHSS).

   The previous investigations sections summarize several past studies and note that the polychlorinated biphenyl (PCB) contamination at OU12 will be investigated in a separate program. This is important because several potential areas of contamination (PACs) in the HRR are identified as potential PCB spills. Additionally, the sandblasting area, identified as PAC 400-807 in the HRR, will be investigated under the IHSS 157.2 (Radioactive Sites South) activities.

   The geology and hydrology section summarizes of the information found in the *Final Geologic Characterization Report* for 1989 (EG&G, 1990). However, it contains one glaring error: well 15889 has been mislocated on all the figures in this section. This results in some highly improbable hydrologic maps and interpretations. Therefore, this section will require some significant rewriting and changes to all figures which use values from well 15889 for mapping.

   The nature of contamination section is based on the HRR and some new validated data. It accurately summarizes the existing knowledge of OU12 contamination.

3. Section 4.0 (data requirements and data quality objectives) contains a generic discussion from previous RFP work plans for other OUs. Significantly though, the discussion on sample spacing takes into account the size and type of contaminants in each IHSS. The elements and compounds for analysis includes the complete suite from the target compound list (TCL), volatile organics, target analyte list (TAL)

metals, and radionuclides. This appears to be a reasonable Phase 1 approach because of the variety of contamination, the minimal documentation on what was released at each IHSS, and the proximity of the various IHSSs.

4. Section 6.0 (in the field sampling plan [FSP]) is organized along the lines suggested by CDH and EPA for the FSP OU 10 RFI/RI work plan. The described procedures in general appear adequate to meet the objectives set out in Section 6.1 of the FSP. Nevertheless, the FSP must include some discussion of the detection limits for the high purity germanium (HPGe) and the mobile gas chromatograph (GC) systems. Due to special concerns regarding potential calibration problems with the HPGe, SOPs for the radiation surveys using the HPGe, in both laboratory and field settings, must also be submitted as a part of this work plan. Because much of the following work at OU 12 will be based on the results of these studies, the quality of the data they generate must be discussed and documented.

   The individual figures showing sampling locations for each IHSS are certainly useful and necessary. It might also be advantageous to present all of the IHSSs (except 147.2) and associated sampling locations on one figure. By doing this, duplication of sampling efforts resulting from overlapping IHSSs would be avoided and spatial relationship of all sample locations could be easily discerned.

5. Section 8 (human health risk assessment) presents a cohesive strategy to carry out the human health risk assessment for OU12. It discusses in sufficient detail the four essential components of the risk assessment process as outlined in the *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual* (RAGS) (EPA, 1989). Each section presents enough information to conclude that the correct methodology will be employed. Although additional specific information would be helpful, it is not necessary as long as all pertinent information will be submitted for EPA review prior to conducting the investigation.

   The work plan contains two problem areas to EPA's stated position, and EPA guidance (1989). The first is the intention to use the International Commission on Radiological Protection (ICRP) procedures to estimate risk. The second involves the strategy to be used in selecting potential chemicals of concern (COCs). The following sections contain specific comments regarding these deficiencies.

6. Section 9.0 (environmental evaluation) describes how the OU12 environmental evaluation work plan will be incorporated into the OU9 environmental evaluation. This approach is acceptable as long as the OU9 study covers the entire RFP industrial area.

3.0 SPECIFIC COMMENTS

1. Section 1.0, Page 1, second paragraph. Several mistakes are present here and corrections need to be made: third sentence, delete the word program and replace the word six with sixteen; the fourth sentence is incomplete and should be either deleted or completed; fifth sentence, CDH is the lead agency for OU12, not EPA.

2. Section 1.3.3.8, page 21. This section describes the lithology of the Arapahoe Formation and discusses the difficulty in distinguishing between it and the Laramie Formation. It is recommended that the discrepancies that arise from the stratigraphic interpretation put forth in the *Phase II Geologic Characterization*, (EG&G 1992), be more clearly explained here so that subsequent references to the Arapahoe and Laramie formations are consistent and not confusing. Specifically, for the central and western areas of the plant, the Phase II GC report correlates the uppermost or No.1 Arapahoe sandstone to what it calls the Arapahoe marker bed. It goes on to use the base of this interval as the contact between the Arapahoe and Laramie formations, whereas previous reports include five sandstone intervals in the Arapahoe formation. As a result, the thickness of the Arapahoe formation according to the Phase II GC is between 15'-25' as opposed to approximately 150' as stated in this work plan and in most previous reports.

3. Section 1.3.3.8, page 24, second paragraph. The conclusion stated here that the unconfined aquifer at RFP is "... not generally believed to be capable of producing economical amounts of water", must either be quantitatively documented or be deleted. The discussion of hydraulic conductivities of the aquifer in this section is not sufficient to draw such a conclusion.

4. Figure 1-4. The legend for this figure shows RFP as draining to various surface water monitoring sites. These monitoring sites are not discussed in the text or legend. The text or legend should describe these sites or they should be removed from the figure.

5. Figure 1-8. This figure was first used in the OU8 work plan and still shows the outline of OU8 on the map. This outline should be removed to avoid confusion about its purpose on this figure.

6. Figure 1-10. This figure shows a stratigraphic column from LeRoy and Weimer (1971). A more detailed stratigraphic section that also includes a revised interpretation for the contact between the Arapahoe and Laramie Formations must be substituted for the older section. Figure 4-53 from *Phase II Geologic Characterization*, (EG&G, 1992), shows this revision alongside a previous stratigraphic column and would be a much better figure to use in this work plan. It would also conform to the geologic map and cross-section shown in figures 1-11 and 1-12 that were taken from the same document.

7. Figure 1-11. This figure is a geologic map of the RFP area. The symbols for the cross section should be added to the explanation portion of this figure.

8. Figure 1-12. This figure is a geologic cross section, the ends of which should be labeled A and A' to correspond to its location on the previous geologic map.

9. Section 2.1.3, page 7, second paragraph. The first sentence incorrectly states that the outline of IHSS 157.2 includes the soils surrounding building 440. It actually runs along the north side of building 440 and only includes the paved area north of 440.

10. Section 2.1.3, page 8, first paragraph. This paragraph discusses background contaminant levels in a ditch south of Building 444. It is unclear how these background values relate to the site-wide background geochemical report. This must be clarified.

11. Section 2.1.7, page 16. IHSS 147.1 has been officially transferred to OU9 for investigation and need not be included in the final version of this work plan.

12. Section 2.2.2, page 26, first paragraph. Since many of the PCB sites fall into the OU12 boundaries, it is appropriate to briefly discuss here the plans for investigation of these sites. The statement that it is assumed that separate programs will handle such activities is insufficient.

13. Section 2.2.2, page 26, second paragraph. This section discusses previous investigations and the impacts of other OUs on OU12. However, it does not discuss how investigations of IHSSs found within the boundaries of OU12 but assigned to other OUs will be coordinated with the OU12 investigation. This must be clarified in this section.

14. Section 2.3.2, page 33, second paragraph. The third sentence incorrectly states that alluvial water levels are highest during late summer and fall. Spring to early summer is when recharge is greatest and the water table is highest. The significance and veracity of the last part of the sentence, "... whereas some wells go dry at this time of year.", needs further explanation.

15. Section 2.3, page 28, paragraph 2. This paragraph states that Appendix D contains borehole logs for all well locations used in the work plan. The borelog for Well 15889 could not be found in the appendix. This borelog needs to be added, and Appendix D needs to be checked to make sure it contains all the wells shown on Figure 2-30.

16. Section 2.3.2, page 35, paragraph 2. The influence of infilled utility trenches and footing drains to the hydrogeology of OU12 is discussed in this paragraph. These potential preferred migration pathways are very important and must be identified as

thoroughly as possible prior to any sampling so that sample locations are appropriately located. The statements here indicate that locations of these features will not be determined prior to initiating fieldwork and therefore will not be used in placing sample locations in areas of potentially preferred migration pathways.

17. Section 2.3.2, page 36, paragraph 2. This entire paragraph must be deleted since the mislocation of well 15889 explains what appeared to be a very anomalous ground water mound.

18. Section 2.4.1, page 37, paragraph 2. This paragraph discusses a release that contaminated the IHSS 116.1 area. However, the time frame of the release is not given. The time of the release should be added to this discussion if available.

19. Section 2.4.1.1, page 38, paragraph 2. This paragraph states that normal beryllium concentrations are 0.01 to 2 milligrams per gram (mg/g) of soil. However, no reference for citing this relatively high background value is given. A reference must be added for these values.

20. Section 2.4.2.1, page 43, paragraph 1. This paragraph discusses beryllium concentrations in soils and refers to Figure 2-37. The units of concentration for beryllium on Figure 2-37 are explained as micrograms per kilogram (μg/kg) whereas the units are expressed as mg/kg on page 43 and Table 2-4. This discrepancy needs to be corrected.

21. Section 2.4.2.1, page 43, paragraph 1. This paragraph states that chromium concentrations ranged from 5.5 to 34 mg/kg. These values include concentrations in the deeper soils, which are those below 3 feet deep. However, Figure 2-37 shows only the chromium concentrations for shallow soils. The text must be clarified to note that Figure 2-37 depicts data from only the top three feet.

22. Section 2.4.2.1, page 43, paragraph 2. The data presented in Table 2-4 indicate slightly higher concentrations in soils at depths greater than 3 feet as opposed to slightly lower as stated in the text. This must be corrected.

23. Section 2.4.2.1, page 44, last paragraph. This section states that ground water quality data is only available from two wells in the vicinity of OU12, neither of which actually lie in its boundaries. Were none of the dozen or so wells which are actually shown to be in OU12, actually sampled for ground water analysis? If they were sampled, why is the data not available?

24. Section 2.4.2.2, page 47, paragraph 4. This section discusses the shallow soil and groundwater analytical data in relation to background data presented in the *Background Geochemical Characterization Report* (EG&G, 1990). After review by EPA, the geochemical characterization approach has been extensively revised.

Therefore, discussion of contamination compared to background must be qualified as related to interim values at this time.

25. Section 2.5.4, page 59. The primary goal of the OU12 RFI/RI is to gather data that can be used to define the nature and extent of contamination, which can also be used to support a Baseline Risk Assessment. This correction must be made to the first sentence of this section.

26. Figures 2-29,30,31,34,35,36,37,and 38. These figures have well 15889 mislocated. The *Geological Characterization Report* (EG&G, 1992) lists the state coordinates for this well as being 749125 North and 2080718 East. This puts well 15889 about 2000' west of the location shown and at the west central edge of these figures. When properly plotted, all anomalous features disappear from these figures. This well must be plotted in the correct location, and the associated figures and text related to its misplacement must also be corrected as needed. Additionally, it is suspected that wells 17889, 11989, and 11589 were abandoned in 1989. The active or abandoned status must be verified for all wells shown in these figures, so that existing active wells might be incorporated into the field sampling plan.

27. Section 3. The preliminary identification of potential chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for surface water and ground water presented in this section is the subject of a separate review process and comments from the EPA and CDH will be submitted in a separate document. The final version of this work plan must be amended to reflect any such comments that are submitted.

28. Section 3.2, page 8, paragraph 3. Preliminary Remediation Goals (PRGs) for those chemicals that do not have ARARs associated with them should be calculated assuming more than industrial land use as is stated here. A future onsite residential land use scenario must also be used in such calculations so that a range of PRGs might be established that can be applied to various future land uses.

29. Section 4.1.2.2, page 4, paragraph 4. This paragraph states that the mean concentration of chromium in OU12 is less than the background concentration. It is significant that none of the sample locations are within the areas of the former cooling tower ponds that were thought to be contaminated with chromium. Therefore, chromium contamination levels at OU12 are still unknown. This fact must be added to this discussion.

30. Section 4.1.4, page 7, paragraph 2. The first sentence states that select OU12 IHSSs. will be characterized for nature and extent of contamination. This must be changed to apply to all OU12 IHSSs.

31. Section 4.1.4, page 7, last paragraph. Collection of OU12 surface water data through the sitewide program is mentioned here. To ensure that the needs of the OU12

RFI/RI are met for this type of data, additional discussion must be included in Section 6, Field Sampling Plan, regarding surface water sampling locations, numbers of samples, types of analysis, etc.

32. Section 4.2.5, page 16, paragraph 3. What is the sixth type of activity to be performed? (Only five are listed here).

33. Section 5.55.2, page 8, last paragraph. "Site-specific background concentrations" are cited as being the levels above which sample concentrations are considered evidence of contamination. The term, site-specific background concentrations, needs to be further defined so that its applicability may be assessed.

34. Section 5.5.2, page 9, paragraph 1. This paragraph states that data will also be compared to sitewide background values from the *Final Background Geochemical Characterization Report for 1989* (EG&G, 1990). As previously stated, background values from this report have not been approved as being final values for such uses.

35. Section 6.2.1.1, page 4, paragraph 2. The assumption that "... radionuclide distribution is relatively homogeneous over the field of view, and that the distribution varies only with depth" may not be valid for releases that have only impacted relatively small areas, as is the case for many in OU12. Field of view for the HPGe is stated as being a circle of either 45' or 195' in diameter, depending on mounting height. Further discussion must be included that will define "relatively homogenous" and clarify this statement.

36. Section 6.2.1.1, page 5, paragraph 2. The use of tripod vs. vehicle mounted detectors is discussed here. It is also necessary to discuss any differences in sensitivities between the two systems and how results gathered using the different techniques will be correlated.

37. Section 6.2.1.1, page 6, paragraph 1. This paragraph discusses soil sampling for radionuclides in areas now covered with asphalt. It states that depth profiles to use with the HPGe survey will not be taken in these areas. Soil profiles must be taken in these areas for the same reason that it is being done in unpaved areas and also to determine if the original surface soil has been disturbed between the time of contamination and asphalt paving.

38. Section 6.2.1.1, page 6, paragraph 2. This paragraph discusses the use of a laboratory-based HPGe detector. It states that the HPGe detector will detect concentrations of gamma-emitting, off-site radionuclides. It is not clear from this statement what is meant by "off-site radionuclides" or how these will be separated from RFP-generated radionuclides. This point must be clarified.

Depending upon the confidence level for which the laboratory HPGe detector results will be confirmed by offsite laboratory analysis, it might be prudent to preserve all, or a portion of all soil samples, that will be analyzed by the laboratory HPGe for possible submittal to offsite labs. By doing this, if it is found that there are problems with the laboratory HPGe, it would not be necessary to collect an additional set samples. Further discussion of this matter in the work plan is necessary.

39. Section 6.2.1.2, page 8, paragraph 1. This paragraph discusses the use of a hydraulic probe rig for soil gas sampling. It states that "at several sites where no historical evidence of volatile organic compound contamination exists, soil and groundwater screening samples will be collected in the absence of a prior soil gas survey." The reason for collecting these samples needs to be clarified in the text.

40. Section 6.3, page 18, paragraph 2. This paragraph discusses how uncontaminated IHSSs will be delineated. Such a discussion is premature and must be eliminated from this section.

41. Section 6.3.1, page 22, paragraph 2. The last sentence in this paragraph lists collection and analysis of soil samples from boreholes. It must be clarified that this is the minimum number of samples per borehole. The same comment applies to page 24, paragraph 2.

42. Section 6.3.2, page 23, paragraph 2. This paragraph discusses the HPGe radiological survey. It states that at the site concrete must be cored to obtain soil samples under the concrete. Neither Figure 6-2 nor 6-5 show sample locations on concrete. The area to be sampled is shown as pavement, presumably asphalt, rather than concrete. This discrepancy between the text and figures should be clarified.

43. Section 6.3.11, page 38, paragraph 1. This paragraph refers to Figure 6-22 however, figure 6-11 shows IHSS 147.2 referred to in the text. This needs to be corrected.

Although no specific releases have been documented for this IHSS, it seems that complete characterization of this site cannot be accomplished by two surficial soil/depth profile samples and the radiation survey. Due to the fact that little is known about this site additional sampling must be performed. It is recommended to add a soil gas survey, soil and groundwater screening, temporary well points, and one borehole/monitoring well. Thickness of the alluvium at this site is less than 10 feet, so costs involved with the added sampling would be less than other areas. In addition, data from this isolated IHSS could be quite valuable in mapping efforts.

44. Section 6.4.4, pages 41 and 42. The SOPs to be developed for collection of soil and groundwater screening samples using the hydraulic probing rig and for measuring water levels and identifying flow direction using a pneumatic water level indicator must be submitted with the final version of this work plan.

45. Section 6.4.6, page 44, third paragraph. The fourth sentence incorrectly references figure 6-9. The correct figure is 6-12.

46. Section 6.5.3, Page 51. The text references Table 6.4, when it should reference Table 6.3.

47. Section 6.6, Pages 51-52. The Data Management and Reporting Plan presented here is vague and somewhat confusing. Although it is understood that RFEDS is still evolving, a more specific and detailed account of data management and reporting procedures and timeframes is an important part of this work plan and needs to be in place prior to work plan approval. Clarification of the specific field data parameters that will be entered into RFEDS by way of example will demonstrate that this aspect has been designed prior to startup. In addition, sample tracking report formats from RFEDS must be included in this workplan as well as some description of the timeframes involved in generating and distributing these reports.

48. Section 6, Table 6.1. Overall this table is helpful in presenting a summary of the IAG required vs. proposed sampling activities for OU12, however, in certain aspects it must be clarified and revised. The most confusing portion deals with surficial soil samples and associated footnotes a, b, and c. Specifically, these samples need not be listed twice for IHSS groups 116, 136, 157.2, and 120, but the subsequent analysis activities must agree with the details specified in the text for each IHSS. In addition, footnote e is incomplete and could not be found in the table.

49. Section 6, Table 6.5. This table indicates that field blanks are not required for organics. A justification for not using field blanks for organics must be included in either the text or with the table.

50. Section 6, Figure 6-5. In this figure, it appears that there are a few areas that may need added coverage for the radiological survey. One additional location needs to be added near the southeast corner of building 444, by the ingot open storage area. The south side of building 447 would be covered better if one of the survey locations were moved north 50 feet. One additional location needs to be added in the unpaved area northwest of IHSS 116.1.

51. Section 7, Page 1, first paragraph. Submittal of this work plan to EPA and CDH occurred on May 8, 1992, not March 8, 1992, as stated.

52. Section 7, Page 1, second paragraph. This paragraph is suggesting that lengthy lab turn-around times may result in missing deadlines that have been set forth in the IAG. Since this concern is already being presented, it seems appropriate that actions must be planned now that would initiate and accelerate sampling activities in timeframes that would allow for longer lab turn-around. Such actions will also benefit

preparation of the BRA and are more advantageous to the project as a whole than merely suggesting that future extensions may be needed. One possibility might be to arrange for necessary permits ahead of time, so that actual field work could begin in November rather than December. It also seems that less time should elapse between the screening/sampling activity and drilling phase of field sampling activities.

53. Section 8.0, Page 2, last paragraph; page 3, first paragraph. The work plan states that, "The EPA and DOE require a two-phase evaluation for the radiological portion of the assessment" and, "The implementation of procedures established by the International Commission on Radiological Protection (ICRP) and adopted by the EPA (is) used to estimate the radiation dose equivalent to humans from potential exposure to radionuclides through all pertinent exposure pathways." This statement is not accurate. EPA does not currently require the ICRP method to be used, either alone or in tandem with the methodology presented in RAGS. Indeed, the ICRP method, because it was developed for occupational exposure and based on a "Reference Man," is not entirely appropriate for use at a Superfund site. The reference man is healthy, 20 to 30 years of age, and clearly does not represent the general public that may be exposed to radionuclides. A more complete description of the disparities between ICRP and EPA methodology can be found in *Transuranium Elements, Volume II, EPA Office of Radiation Programs*. Since the risk assessment is intended for EPA, it must use EPA-derived procedures. Until the ICRP method is officially adopted by EPA Region 8, it must not be included in the risk assessment, except perhaps as an addendum.

54. Section 8.0, page 5, third paragraph. The text states, "With DOE's future ecological land use plans for the OU12 industrial area, future onsite residents are not likely target populations". DOE's future plans are irrelevant in a human health risk assessment. The risk assessment must address the possibility of residents living in the area. It is plausible that residential development in the area will occur in the next century when most of the radiological contaminants could still be present. In addition, it would be inconsistent with other OUs, since a residential-use scenario has been the conventional assumption. Intentions, regardless of how altruistic, must not be included in the quantitative risk assessment. A residential scenario must be included in the exposure assessment.

55. Section 8.0, page 6, second bullet. Dermal exposure to contaminants in soil was omitted and must be included as a possible exposure route from surficial soils.

56. Section 8.1.2, page 7, second paragraph. Again the groundwork is being laid for activities that may cause delays in the IAG schedule. If additional ground water investigation activities are anticipated, they must be at least tentatively identified and scheduled so that the likelihood of delays can be reduced.

57. Section 8.2.2, page 9, last paragraph. The second sentence delineates TICs that will be excluded from the Human Health Risk Assessment. This statement seems to be premature and must be deleted.

58. Section 8.2.3, page 10, second paragraph. The word "RFP-related" must be removed from the first sentence.

59. Section 8.2.4, page 11, second paragraph. The flow chart and description of the strategy to be used in the selection of contaminants of concern (COCs) contains major design flaws. The steps must be rearranged because the order of criteria in the flow chart is as critical to the selection process as is the specific criteria used to select COCs. For example, no class A carcinogen should be eliminated from the risk assessment under any circumstance. However, as presented in the flow chart, known human carcinogens could be eliminated in the first or second step. A decision must be made about class A and B carcinogens in the initial screening step.

RAGS states that, "In general, comparison with naturally occurring levels is applicable only to inorganic chemicals, because the majority of organic chemicals found at Superfund sites are not naturally occurring." Accordingly, the elimination of background chemicals must be limited to inorganic chemicals. Moreover, background concentrations must be collected from an area minimally impacted by man and must accurately represent the RFP area. Due to natural variation of geographical regions, U.S. Geological Survey data should not be used for this purpose, unless it can clearly be shown that the data were specifically drawn from the area.

RAGS presents the concentration-toxicity screen in great detail. It should be used instead of the screening step which uses one-tenth health environmental criteria for elimination. The one-tenth criteria is not an EPA-endorsed methodology.

60. Section 8.2.4, page 11, paragraph 3. It is stated here that the data will be evaluated according to RAGS section 5.9.3 to determine if the detection frequency is greater than 5 percent. RAGS does not state that 5% is the detection frequency limit - it says that "any detection limit to be used (e.g. 5%) should be approved by the RPM prior to using the screen".

61. Section 8.2.4, page 13, paragraph 2. This section states that chemicals which are essential human elements need not be considered further in the quantitative risk assessment. Prior to eliminating those chemicals, however, they must be shown to be present at levels that are not associated with adverse health effects. Hence, a quantitative risk assessment must be performed. In addition to the relatively innocuous constituents described in the plan, be aware that chemicals such as arsenic and selenium are also considered essential elements.

62. Section 8.3.1, page 16, paragraph 2. The definition provided for the Reasonable Maximum Exposure is not exactly correct. Exposure is a function of chemical concentration, contact rate, exposure frequency and duration, body weight, and averaging time. The exposure concentration RME is defined as the 95 percent upper confidence limit on the arithmetic average. The RME for the other components of exposure cannot be based solely on quantitative information, but also requires the use of professional judgement.

63. Section 8.4, page 20, paragraph 3. The discussion of toxicity values focuses on RfDs and cancer slope factors with no mention of Inhalation Reference Concentrations (RfCs). These values will be important when assessing the inhalation pathway or the volatilization of contaminants from ground water or surface water. They must also be discussed in this section.

64. Section 8.4, page 21, paragraph 2. This section discusses the information sources of toxicity values which are used by EPA. The authors should be aware that there is an established hierarchy of data sources within EPA. As described in RAGS, the IRIS system is first, followed by the HEAST, and then toxicity values developed in consultation with the ECAO Technical Support Center. This section gives the reader the impression that, other than IRIS, the other sources of information available are equal in quality and preference.

65. Section 8.5, page 24, paragraph 2. The method presented in this paragraph for assessing non-cancer health effects is overly aggressive and may be unnecessary. Hazard Quotients (HQs) are initially the sum of all Hazard Indexes (HIs), regardless of mechanism of action. Then, if the HQ exceeds 1 the compounds are segregated based on target organ and mechanism of action. This segregation process can be complex and time consuming, and should not be undertaken unless it is known that the sum of all the HIs clearly exceed one.

66. Section 9.1, page 1, paragraph 1. If there are no viable ecosystems or natural habitats presently existing in OU12, as stated here, why is this OU being considered for an ecological preserve?

67. Section 9.3, page 3, paragraph 3, bullet 1. The work plan states that the presence of target taxa, which are accumulating or concentrating target analytes, is a criterion for initiating ecotoxicological studies. The method for determining concentration or accumulation of chemicals prior to ecotoxicological studies is not clear. The criterion must be clarified.

68. Section 9.3, page 3. In the section under Ecotoxicological Investigations, a number of conditions were presented which would trigger an investigation. What about the effect of contaminants moving off-site and adversely affecting target taxa?

69. Section 9.0, table 9.1. The key of status symbols does not include a definition for 9. This definition must be provided.

70. Section 10, Figure 10-1. This figure should be updated with the names of the personnel who are currently in the positions shown on the chart.